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ABSTRACT

The reform of elementary and secondary school mathematics education in the United States has received renewed attention with the publication of several mathematics reform documents and the 1989 Education Summit sponsored by the nation's governors and President Bush. This digest lists documents and programs in four areas: (1) curriculum and testing, which focuses on the reform of mathematics education and on projects which have begun to answer this challenge including the National Council of Teachers of Mathematics' framework for the needed curriculum changes and its widely accepted document "Curriculum and Evaluation Standards for School Mathematics" and others; (2) teachers and teaching, which outlines programs for needed changes in teacher preparation; (3) school restructuring; and (4) Minority tracking. A list of 13 references is provided. (CW)

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Meeting National Goals for 2000 and Beyond in Mathematics Education

The reform of American elementary and secondary school mathematics education, launched in the 1980s, has received renewed attention because of the Mathematical Sciences Board's (MSEB) *Everybody Counts* (1989) and the 1989 Education Summit sponsored by the nation's governors and President Bush. The Summit's fourth national goal for education states, "By the year 2000, U.S. students will be first in the world in mathematics and science achievement." To meet this goal, three specific objectives have been announced:

- Math and science education will be strengthened throughout the system, including special emphasis in the early grades.
- The number of teachers with a substantive background in mathematics and science will increase by 50 percent.
- The number of U.S. graduate and undergraduate students, especially women and minorities, who complete degrees in mathematics, science, and engineering will increase.

If the nation is to achieve this fourth goal, Linda Darling-Hammond (1990) identifies three areas needing change:

- Curriculum and testing
- Teachers and teaching
- School restructuring

Some local, state, and national initiatives are focusing on these three areas through the development of guidelines, models, and processes for the needed reforms.

Curriculum and Testing

The National Council of Teachers of Mathematics (NCTM) has provided a framework for the needed curricular changes with its widely accepted document, *Curriculum and Evaluation Standards for School Mathematics* (1989). Many recent local and state curricula revisions are being patterned after this set of standards. Examples are the Ohio Department of Education's *Model Competency-Based Mathematics Program* (1990) and the California State Board of Education's *Field Review Draft of the California Mathematics Framework*, (1990) both of which rely heavily on the National Council of Teachers of Mathematics document for their direction.

Parallel changes in the testing industry are supporting some of the curricular restructuring. *The College Board News* (1990: 1) reports that the Scholastic Aptitude Test (SAT) is moving to a format to "include more data interpretation and applied mathematics questions, geared to problem solving."

Teachers and Teaching

John Goodlad's book, *Teachers for Our Nation's Schools (1990)*; The Holmes Group's *Tomorrow's Schools: Principles for the Design of Professional Development Schools (1990)*; and the Mathematical Association of America's (MAA) *Call for Change: Recommendations for the Mathematical Preparation of Teachers of Mathematics* (1991) all outline strong programs for needed changes in teacher preparation.

Not all the emphasis is on pre-service teachers. The establishment of a mathematics working group within the National Board for Professional Teaching Standards and the release of NCTM's *Professional Standards for Mathematics Teachers* (1991) together focus national attention on, and give direction to, upgrading the nation's mathematics teacher corps. Some funds are available from one of the on-going U.S. Department of Education programs, Eisenhower-Title II, to support in-service programs for strengthening K-12 mathematics teaching.

School Restructuring

Organizational school restructuring is being supported on many fronts. Some of the

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most comprehensive programs are being developed by Theodore Sizer's Coalition of Essential Schools; the University of Wisconsin's National Center for Research in Mathematical Sciences Education; and Michigan State University's Center for the Learning and Teaching of Elementary Subjects. These efforts will be advanced by the $31 million National Science Foundation's (NSF) Statewide Systemic Initiatives (Committee on Education and Human Resources, 1991).

The business community is also helping to drive the restructuring movement by forming educational partnerships. For example, Exxon's Education Foundation is supporting multisite professional development models for K-3 mathematics specialists. This project specifically focuses on the Summit's objective to improve mathematics instruction in the early grades.

Minorities - Tracking

Two closely related concerns permeate all three of the areas that Darling-Hammond has identified as needing change. The first is the role that tracking plays in limiting the number of minorities involved in mathematics, and the second is how to increase their number (Oakes et al., 1990). Numerous multilevel efforts have been initiated to address these problems, some of which are the following:

- MAA's Strengthening Underrepresented Minority Mathematics Achievement (SUMMA) project to attract minorities to teaching.
- MSEB's *Making Mathematics Work for Minorities Framework for a National Action Plan: 1990-2000.*
- Council of the Great City Schools' National Urban Education Goals.
- NCTM'S Algebra for Everyone project.
- NSF's Alliances for Minority Participation (AMP) program.
- University of Pittsburgh and Ford Foundation's cooperative endeavor, Quantitative Understanding: Amplifying Student Achievement and Reasoning (QUASAR).

References

California State Board of Education. *Field Review Draft of the California Mathematics Framework*. Sacramento, CA: The Board, 1990.

College Board. "Board Announces Changes." *College Board News* 19: 1-2, November-December 1990.

Committee on Education and Human Resources, Federal Coordinating Council for Science, Engineering, and Technology. *By the Year 2000: First in the World*. Washington, DC: Department of Energy, 1991.

Darling-Hammond, Linda. "Achieving Our Goals: Superficial or Structural Reform?" *Phi Delta Kappan 72* : 286-95, December 1990.

Goodlad, John. *Teachers for Our Nation's Schools*. San Francisco, CA: Jossey-Bass Publishers, 1990.

Holmes Group. *Tomorrow's Schools: Principles for the Design of Professional Development Schools.* East Lansing, MI: The Holmes Group, 1990.

Mathematical Association of America. *A Call for Change: Recommendations for the Mathematical Preparation of Teachers of Mathematics*. Washington, DC: Mathematical Association of America, 1991.

Mathematical Sciences Education Board. *Everybody Counts: A Report to the Nation on the Future of Mathematics Education*. Washington, DC: National Academy Press, 1989. ED 309 938

Mathematical Sciences Education Board. *Making Mathematics Work for Minorities-Framework for a National Action Plan: 1990-2000*. Washington, DC: National Research Council, 1990.

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA.: National Council of Teachers of Mathematics, 1989.

National Council of Teachers of Mathematics. *Professional Standards for Teaching Mathematics*. Reston, VA.: National Council of Teachers of Mathematics, 1991.

Ohio Department of Education. *Model Competency-Based Mathematics Program*. Columbus, OH: The Ohio Department of Education, 1990.

Oakes, Jeannie, Tom Ormseth, Robert Bell, and Patricia Camp. *Multiplying Inequalities: The Effects of Race, Social Class, and Tracking on Opportunities to Learn Mathematics and Science*. Santa Monica, CA: The Rand Corporation, 1990.

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